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Short Communications

Dusting in Falcons

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Birds keep their plumage in good condition with routine maintenance, including bathing, drying, oiling, powdering, preening and plumage scratching. Such behaviours form a homogeneous functional group to which the activities of dusting, sunning, anting and even smoke-bathing could be subsidiary (Campbell and Lack 1985). Falcons (Family Falconidae) have been reported to use several different methods of "bathing": stand-in bathing while standing or crouching in shallow water, flight-bathing on the wing through a series of dips and rises, rain-bathing on a perch or on the wing and snow-bathing (see Cade 1960; Herren 1960; Fischer 1967; Lauer 1968; Keicher 1969; Glutz von Blotzheim et al. 1971). Other methods are sun-bathing (Ristow et al. 1980; Cade 1985) and dusting—the terms *dust-bathing* and *sand-bathing* have been rejected by Campbell and Lack (1985: 161), who restricted the term *bathing* to true bathing in water (Heinroth and Heinroth 1927; Glutz von Blotzheim et al. 1971; Ostermüller 1973; Ristow et al. 1980; Schmidl 1985; Holthuijzen et al. 1987). Anting (Potter 1970) and smoke-bathing (Prideaux 1947) have not been reported for falcons. Observations of dusting in falcons indicate two different patterns: dusting while *lying* and dusting while *sitting*, two patterns which correspond to dusting behaviour of pigeons (Family Columbidae) and, according to Nicolai (1962), may be regarded as evolutionary steps in the development of dusting behaviour.

Dusting is "a highly specialized, stereotyped behaviour of birds whereby 'dust' (fine earth, sand, etc.) is deliberately introduced into the plumage and later expelled . . . Dusting bouts are typically organized in three main phases, often repeated: 1) loosening substrate if necessary and formation of dusting hollows or wallows by scraping and digging; 2) tossing dust into and onto plumage and rubbing the head in dust; 3) ruffling dust through the plumage and shaking it out. Though the dusting bird may stand initially, it squats or lies down for most of the bout with feathers ruffled and wings drooped, often rotating its body, rising from time to time and at the end to shake" (Campbell and Lack 1985:161). Recent evidence for the function of dusting in birds strongly suggests that "dusting helps in feather maintenance, either on its own or in combination with the head-scratching and preening that intersperse or follow bouts. Experiments on quails (Statkiewicz and Schein 1980) indicate that regular dusting maintains the optimum amount of oil on the plumage by removing excess preen-oil and other feather lipids, these being absorbed by the dust and then removed with it plus any dry skin, feather debris, etc. The plumage of birds deprived of the opportunity to dust becomes oily and matted within a few days" (Campbell and Lack 1985:162). Other functions include the treatment of ectoparasites (the absence of such parasites at times when the behaviour occurs does not disprove the theory) and their discouragement (Wink et al. 1979; Holthuijzen et al. 1987).

Specific observations of dusting in falcons are not as detailed as the general description given above. Glutz von Blotzheim et al. (1971:733), for example, mention that "Kestrels *Falco tinnunculus* seem to enjoy sand or dust baths, they dip their heads, beat their wings and waggle their tails while performing the typical bathing motions" (cf. Heinroth and Heinroth 1927:108; Boyle 1952; Giese 1955; Glutz von Blotzheim et al. 1971:733). In the Lesser Kestrel (*Falco naumanni*) "the feathers are ruffled and the head tucked in; the wings, drooping on either side, are beaten against the body and the feet make rapid scratching movements (Bernhauer *in* Glutz von Blotzheim et al. 1971: 763). Dusting Prairie Falcons (*Falco mexicanus*) "shuffled their abdomens through the fine sand with the feathers fluffed out and their wing and tail feathers extended, and frequently made dipping motions with their heads and bodies" (Holthuijzen et al. 1987:135). Wickler and Seibt observed a dusting Lanner Falcon (*Falco biarmicus biarmicus*) in Natal, South Africa, "the bird lay half on its right side, the underside of the right-hand wing lay on the ground, its head pointed towards us, chin on the ground. It scratched in the sand with one leg, at least, and shook itself, as dust rose several times" (Schmidl 1985). Eleonora's Falcon (*Falco eleonorae*) "usually lies, with all feathers spread, in the dust pan trying to collect the dust under its body; with vigorous movements the dust is cast up and collected in the feathers. Sometimes the falcon rests with wings spread apart, thereby combining sun- and dust-bathing" (Ristow et al. 1980:54). The Gyrfalcon (*Falco rusticolus*) (E. Müller, pers. comm.) and Peregrine Falcon (*Falco peregrinus*) (Walliser *in* Glutz von Blotzheim et al. 1971:906; G. Speer, pers. comm.; R. W. Nelson, pers. comm.) also take opportunistic dust baths. Ostermüller (1973:65) observed "a male Peregrine Falcon at a breeding place in Northern Germany. It circled in sunny dry weath-

er (22°C) over a rock promotory and then swooped from a great height onto a freshly ploughed field bare of vegetation. There he sprang forwards in three or four rapid leaps of about 0.5 m (leaps resembling those of black-birds *Turdus merula,* checked and then repeatedly bent foward and shook his plumage. The movements matched those of a Peregrine bathing in water, as caught in a photograph by Fischer 1967:61)." The position of this Peregrine is reproduced in Fig. 1A.

Cited, but not necessarily representative observations for the different species nevertheless indicate that falcons show two different patterns:

1) dusting while *sitting*—the falcon squats on the tarsal joint and makes motions similar to water-bathing (Fig. 1A, B);
2) dusting while *lying*—the falcon lies on the ground ruffling dust through the plumage like dusting in galliform birds (Fig. 1C), a process of falcon nest-hollowing using scratching; although in it no vigorous dusting and shaking of the plumage occurs.

Patterns could be regarded as evolutionary steps in the development of well-coordinated dusting behaviour, as shown in pigeons (Family Columbidae) (Nicolai 1962). By comparing a variety of pigeon species Nicolai was able to show how the change from water-bathing to dusting may have evolved. Although dusting behaviour is unusual in columbids, the Galapagos Dove (*Nesopelia galapagoensis*) after bathing in water often initiates dust-bath movements, possibly while sitting, with more or less distinct "scratching of sand up into the plumage" with the beak. The Bare-faced Ground Dove (*Metropelia ceciliae*), an inhabitant of dry highlands in Peru and Chile, even shows dusting behaviour in a lying position as do galliform birds. Such is compatible with Campbell and Lack's (1985:161) statement that dusting is "most characteristic of species living in or originated from bare open habitats, particularly desert, steppe and savanna, where water for bathing—especially of the 'stand-in' type—is scarce or absent."

As in columbids, dusting is unusual in raptors (Ristow et al. 1980:55) but has been observed in the Peregrine Falcon in a sitting position (Ostermüller 1973:65), and for a lying position in the Lanner Falcon (Schmidl 1985) and probably the Prairie Falcon (Holthuijzen et al. 1987: 135) and Eleonora's Falcon (Ristow et al. 1980), the last three inhabiting open and arid biotopes. If, according to Nicolai (1962), dust-bathing has evolved from bathing in water, then dusting in lying position should presumably be the most developed form. At present, insufficient data prevent the demonstration of a similar evolutionary sequence of dusting in falcons, and therefore systematic observations are required.

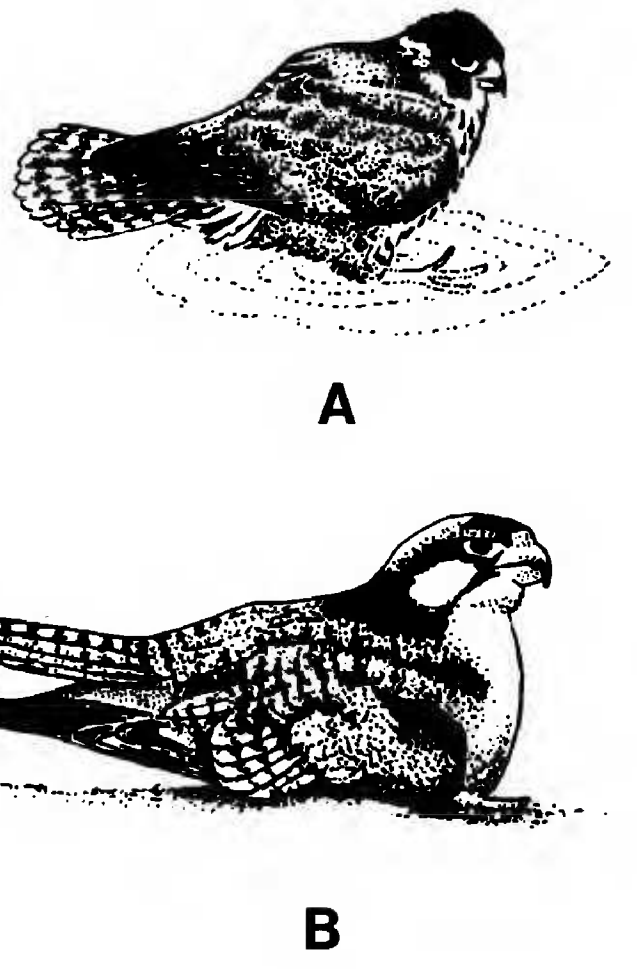

Figure 1. Bathing and dusting behaviour in falcons. A) Peregrine Falcon bathing in water (after Fischer 1967:61). B) Lanner Falcon dusting in sitting position (after Schmidl 1985). C) Lanner Falcon dusting in lying position (after Schmidl 1985).

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